

ON THE GENUS *HALOBATES*, ESCH., AND OTHER MARINE  
*HEMIPTERA*.

BY JAMES J. WALKER, R. N., F. L. S.

The genus *Halobates* is one of the most remarkable and interesting forms of the Order *Hemiptera*, and, indeed, of all insects, both from its truly oceanic habitat (unique, so far as is known at present, among the class *Insecta*), and from the very curious structure and habits of the various species. Since the expedition of von Kotzebue round the world in the Russian ship "Rurick" early in the present century, when three species were described by Eschscholtz, the founder of the genus, from the examples taken by the naturalist Chamisso, these little creatures have attracted the attention and interest of nearly every observant voyager. A literature of some considerable extent has grown up respecting them, and this has been brought together in the well-known and able "Report on the Pelagic *Hemiptera*" (Zoology of the Voyage of H.M.S. "Challenger," part xix, 1883), by Dr. F. Buchanan White, F.L.S., to which I owe much valuable aid in the compilation of these notes.

In the late surveying voyage of H.M.S. "Penguin" in Australian and Chinese waters, I paid a good deal of attention to the habits and distribution of these insects, and I propose to give here a brief summary of my observations, prefaced by those made in a former voyage to the Pacific in H.M.S. "Kingfisher."

Crossing the tropical Atlantic in this latter vessel in 1880, I kept a good look out for the characteristic species of that ocean, *H. Wüllerstorffi*, Frauenf., but neither on this occasion, nor on my return voyage across the Atlantic in 1884, did I observe a single specimen of *Halobates*. The first time that any came under my notice was on October 6th, 1881, in the Gulf of Panamá, but the ship was then steaming at six knots per hour, so I was unable to obtain them. Nor did another opportunity occur until more than a year afterwards, when we were on a voyage from San Francisco to Callao. On November 26th, 1882, we were becalmed for a short time in lat.  $8^{\circ} 12' N.$ , long.  $101^{\circ} 46' W.$ , when I saw a good many specimens on the surface of the sea, and caught six or seven from the ship's gangway (*Ent. Mo. Mag.*, vol. xix, p. 278). These were the widely distributed Pacific species, *H. sericeus*, Esch. On a voyage from Callao to the Marquesas Islands, in February and March, 1883, *Halobates* was frequently observed in the open ocean whenever the usually steady south-easterly breeze fell light for a short time. Several specimens were seen on February 27th

in lat.  $9^{\circ} 35' S.$ , long.  $119^{\circ} 56' W.$ , a position fully 1100 miles from the nearest land, the north-eastern outliers of the Paumotu or Low Archipelago, and more than twice as far from the coast of South America. These oceanic specimens, which I have unfortunately lost, were probably the widely distributed *H. Wüllerstorffi*, Frauent., already known from the Western Pacific Ocean. Only a very few, mostly young larvæ, were taken in the tow-net, the adults appearing to be well able to avoid the net in its passage through the water. In all the harbours and open roadsteads of the Marquesas Islands, a species which I refer with some reserve to *H. sobrinus*, White, was plentiful, especially in Omoa or Bon Repos Bay, Fatou-hiva Island; and I saw what was probably the same species at Papiete, within the barrier-reef which encircles the Island of Tahiti. *H. Wüllerstorffi* was also found at the Marquesas, but much less commonly than the other. Rough weather prevented me from making further observations during this cruise, and in our numerous trips along the coast of Chile and Peru, I never saw the insect at all; these southern waters, constantly cooled to below  $60^{\circ} F.$  by the Antarctic current, to a latitude far within the tropic of Capricorn, are much too cold for the continuance of the species, which evidently require a high temperature during part of the year, at least.

In the voyage of the "Penguin," I first saw *Halobates* in the Red Sea (lat.  $20^{\circ} 32' N.$ , long.  $38^{\circ} 1' E.$ ), but I had no opportunity of taking more than one or two specimens until we arrived at Perim Island, in the straits of Bab-el-Mandeb. Here a species, which is certainly not the *H. Hayanus*, White, recorded from Aden, but agrees well with *H. proavus*, White, from Gilolo, was found rather commonly on the sandy beaches of the Island, under seaweed and other tidal refuse, usually defunct, but often quite fresh and lively. I have a note of seeing *Halobates* (sp. incog.) in the Indian Ocean about 900 miles E.S.E. of Sokótra. in lat.  $8^{\circ} 50' N.$ , long.  $71^{\circ} 24' E.$ , but have no further record until our arrival in the Arafura Sea, off the north-western coast of Australia. A fine species, which appears to be identical with *H. regalis*, Carpenter (described from Torres Straits specimens), was by no means rare in the open sea, and in the channels among the numerous small Islands. It was also frequently found on the surface of pools of salt water left by the receding tide on the coral reefs. On one of these (Guichen Reef, near Troughton Island, lat.  $14^{\circ} 45' S.$ , long.  $125^{\circ} 10' E.$ ), I found, besides the *Halobates*, several specimens of a species of the singular allied genus, *Hermatobates*, Carpenter, closely related to, though differing in many respects from,

the *H. Haddoni*, Carp., recorded from Mabuiag or Murray? Island, Torres Straits. These occurred under large dead bivalve shells (*Tridacna*), and with them I found a good sized spider of very ordinary structure and appearance, which must have been submerged, on this completely isolated reef, twice every day to a depth of ten or more feet. Another very minute apterous but fully adult *Hemipteron*, bearing a close superficial resemblance to the fresh-water genus *Hebrus*, was found not rarely at Cartier and Baudin Islands under blocks of coral on sandy beaches, very little above low-water mark.

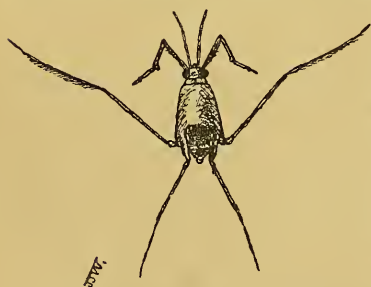
*Halobates regalis* was also tolerably common in the noble harbour of Port Darwin, where I took with it an undetermined species of the allied genus, *Halobatodes*, White. The habitat of this genus appears to be estuarine rather than oceanic, as I subsequently met with it in a similar situation in China. On the voyage from Port Darwin to Hong Kong, in November, 1891, a very fine species of *Halobates* was observed off the coast of Gilolo, in lat.  $1^{\circ}$  N., long.  $127^{\circ}$  E. Several specimens, including both sexes *in cop.*, were taken from the ship's side, and proved to be *H. princeps*, White, recorded from the Celebes Sea.

I noted the appearance of *Halobates* in the China Sea on May 2nd, 1892, about 200 miles due south of Hong Kong; and in the following August, a species which appears to be identical with *H. princeps* was abundant among the Chusan Islands and off the adjacent coast of China in lat.  $30^{\circ}$  N. On the 13th, I went in one of our steam cutters to the head of Nimrod Sound, a long narrow arm of the sea extending inland some thirty miles, and on returning from the shore I saw a very large "school" of the insect congregated under the stern of the boat. There were quite fifty examples in the space of a square yard, and a single dip with a butterfly net served to secure half that number. *Halobatodes* sp. was also met with in Nimrod Sound, and on August 19th at Chin-hae, more than a mile within the mouth of the Yung River (on which the city of Ning-po stands), I observed numbers of what I took for larval *Halobates*, on the surface of the water within a yard of the bank. Unfortunately I neglected at the time to catch any of these, which I more than suspect now to have been *Halobatodes*.

The habits of all the species which I have observed are very much alike. In tropical latitudes, when a sailing ship is becalmed, or a steamer is stopped for any purpose in a perfectly calm sea, it is not long before little whitish creatures are seen rapidly skimming over the glassy surface with a sinuous motion, and soon half-a-dozen or more

*Halobates* are in view at once, evidently attracted by the bulky hull of the ship, which they will approach frequently within arm's length. Their progress appears to be effected by a sort of *skating* action of the long, ciliated intermediate and hind legs. When the ship is anchored in a current or tide-way, they keep abreast of her by a series of short rushes of a foot or so, against the stream, giving a speed quite sufficient to stem a current of two or three knots per hour. I have also noticed that they particularly like the "dead water" next the rudder under the ship's stern, where they may often be seen when none are visible elsewhere. They show great dexterity in avoiding the net, and a quick dip is necessary to effect a capture; the tow-net was often put over astern in the "Penguin" when thus anchored, but it never entrapped a single specimen. I find in my diary for November 26th, 1882 (the first note of their capture), "They (*H. sericeus*) were not caught without a good deal of trouble, as they were exceedingly agile, dodging the net when it came near them, and occasionally diving under it. They seemed to like the sunshine, and were much scarcer when it was overcast." A heavy swell, provided the weather is quite calm, does not prevent their appearance, but with the ripple caused by the slightest breeze, they vanish at once; though sometimes, as at Nimrod Sound, they were to be found in plenty on the narrow belt of smooth water to leeward of the ship, when not one was to be seen on the windward side.

When in the net, all the species are exceedingly active, skipping about with a very lively motion like that of our familiar fresh-water *Gerris*. I have seen them leap quite a foot high from the deck, and have lost a good many through their skipping over the rim of the



*Sketch of Resting Attitude  
of Halobates.*

net into the sea. They are otherwise very helpless out of water, as besides skipping, they can only shuffle along with their thin wiry legs. I have kept the Chinese species alive for several days in a vessel of sea water; at first they are very restless, rushing about and occasionally jumping up two or three inches from the surface, but after a few hours they become much quieter. They then rest on the

water with the legs widely extended, and the intermediate pair brought forward so as to have the tarsi in advance of the head (as in the



annexed sketch, taken from a specimen of *H. princeps* set in the attitude of repose). On the approach of the finger, or a pencil, they dive readily, and swim with great facility beneath the surface, the air entangled in the pubescence giving them a beautiful appearance like that of a globule of mercury or polished silver. This supply of air must be essential to the existence of the insects, which I feel sure must pass a large part of their life beneath the surface of the sea, diving into undisturbed water in rough or even moderate weather, and coming up again only when it is absolutely calm.

I am not able to give any information as to the food of *Halobates*, further than that I have once or twice seen several specimens congregated round small floating objects, such as fragments of seaweed, &c., as if deriving nutriment from it. Nor do they seem to be themselves preyed upon by other marine creatures; at all events, I have seen plenty of small fish about when *Halobates* has been on the sea surface, but have never seen the fish "rise" to the insect. Their integuments are so tough and leathery that they can scarcely be very dainty morsels.

The union of the sexes takes place on the surface of the sea, and the eggs are unquestionably carried about by the ♀, attached to the extremity of the abdomen, for some time before she parts with them. Among my specimens from the Marquesas Islands I have found two females of *H. Wüllerstorffi*, one of which has three ova, and the other a single one, thus attached. These eggs are cylindrical in shape, with rounded ends, of a deep ochreous-yellow colour, and the envelope is of very tough and firm consistence; their size compared with that of the parent is enormous, as they are just over 1 mm. in length. Where they are eventually deposited still remains a mystery, though Prof. Uhler (Standard Natural History, vol. ii, p. 269, Boston, 1884) suggests that the insects may use *Sargassum* or other floating seaweeds as a nidus. I have found young larvæ in the tow-net in the Central Pacific many hundreds of miles from land, but I am inclined to think that oviposition is usually effected within a much less distance of the coast; and all my experience tends to show that the creatures are much more numerous near the land (or at any rate, more frequently observed in large numbers) than in the open ocean.

Dr. Buchanan White, in his "Report," enumerates eleven species of *Halobates* as known to him, and two others have since been described, *H. Whiteleggi*, Skuse (Records of the Australian Museum, p. 174, plate 1), and *H. regalis*, Carp., both from Australian waters. Some of these appear to be very restricted in their distribution, while

others have a very wide range over the ocean. Thus, *H. Wüllerstorffi* appears to extend over the entire Atlantic Ocean between the parallels of 43° N. and 20° S. latitude, sporadic examples occasionally reaching the shores of North Carolina (Uhler, *l.c.*), and is also widely distributed in the Pacific Ocean, over the northern half of which *H. sericeus* is also extensively spread. The former species may even be said to extend to European waters, as a specimen in the Oxford Museum is recorded as from Cape Finisterre. It is even not impossible that stray specimens may reach the south-western shores of these Islands by means of the Gulf Stream, like *Janthina*, *Physalia*, *Velella*, and other organisms of warmer oceanic regions. The Chusan Islands, where I saw these insects in greater abundance than anywhere else, lie well outside the tropics, being intersected by the 30th parallel of N. latitude, and they have a winter of considerable severity, even colder than our own; their summer, however, from June to the end of September, is exceedingly hot, and the temperature of the surface-water of the sea surrounding them rises above 80° for a large part of this time.

I have, in conclusion, to thank Mr. C. O. Waterhouse, of the Natural History Museum (where most of my specimens of *Halobates* are deposited), for kind assistance in identifying the species.

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#### ON THE HABITS OF *MESOVELIA FURCATA*, MULS. & REY.

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This species of *Hydrometridæ* has so seldom occurred in this country, and so little seems to be known of its habits, that the results of a few observations on a colony I have recently met with may be of some interest to Hemipterists. The colony in question I found last August on a pond in an orchard in the hamlet of Fifield, between Maidenhead and Windsor. The pond was a long narrow one, about 120 ft. by 30; on its banks were growing *Alisma*, *Polygonum*, *Lycopus*, *Mentha*, *Bidens*, &c., and in the water was abundance of *Potamogeton natans*, together with *Polygonum*, *Chara*, and some other pond-weeds. *Mesovelia* was to be found on the leaves of the *Potamogeton*, but, in consequence of the greenish colour and extreme slenderness of the insects, it was exceedingly difficult to see them from the banks, and, in fact, I could never be quite certain that I distinguished them, and the numerous small *Diptera* which were also running about over the